

**WATERSPOUTS VISIT TATOOSH ISLAND, WASH.**

By R. C. MIZE, Observer.

[Weather Bureau Office, Tatoosh Island, Wash., Jan. 10, 1918.]

Several small waterspouts were visible at sea, bearing south to northwest from Tatoosh Island, Wash., between 11:45 a. m. and 12:10 p. m. December 1, 1917. The greatest number observed at any one time was six.

A spout was first observed 2 miles southwest of the station at 11:56 a. m.; came within 200 yards of it six minutes later. During that time there was a gentle southerly breeze with a light flurry of moist snow. The sky was overcast with very dark nimbus clouds, all apparently moving from the southwest. The barometer rose from 29.63 to 29.67 inches in six minutes during the approach of this disturbance. There was no lightning. Some observers noted a slight roaring noise. The waterspout moved almost directly northeastward at the rate of 20 miles per hour until it reached the outer rocks, then swerved toward the north and headed directly for the Tatoosh Island lighthouse. Reaching the west side of this island, where the cliff is overhanging with a height of about 95 feet, the waterspout abruptly disappeared at 12:02 p. m. without any evidence of its presence upon the top of the island. It appeared to whirl counter-clockwise, as evidenced by the movement of the funnel cloud and spray. The diameter of the funnel cloud was apparently less than 20 feet, except near its upper extremity where it widened rapidly. The width of its path was about 50 feet and width of the core 5 feet. Heavy spray was thrown to a height of 20 feet, and lighter spray 80 feet or more.

**METEOROLOGY OF GREENLAND'S INLAND ICE AND ITS FOEHN.<sup>1</sup>**

By A. DE QUERVAIN.

(Abstract of paper presented to Swiss Society of Geophysics, etc., Zurich, Sept. 11, 1917.)

As the discussion of the observations by the Swiss expedition to Greenland is approaching completion, it has seemed proper to communicate these definite results which include the first observations made in summer and based on a complete traverse.

The communications have related chiefly to the thermal conditions (central region, daily amplitude, comparison with the fall observations by Nansen); to the régime of the winds with its pronounced diurnal variation; and finally to the annual growth of the inland ice and its probable evaporation during the summer.

The observations made while crossing Greenland, for the first time permit us to establish the fact that in some cases when a föhn is observed on the coast and on the inland ice it must be a wind descending from somewhat in the interior if not indeed quite from the summit line itself of the inland ice.

More ample details will be found in the full report to be published at an early date in the *Mémoires de la Société helvétique des Sciences naturelles*, volume 53.

**551.324 (048)  
VARIATIONS OF ALPINE GLACIERS.**[Reprinted from *Nature*, London, Jan. 3, 1918, 100: 350.]

Prof. P. L. Mercanton, in "*Revue générale des Sciences*" for November 30, 1917, discusses the results of the

more recent observations on the advance and retreat of glaciers, particularly Alpine. Systematic work was begun by Prof. Forel 37 years ago in the Swiss Alps, and for at least 30 of them the movements of the Rhone Glacier and the two at Grindelwald, have been carefully noted. Those on the northern side of Mont Blanc have also been studied, and similar work is now being carried on in other ice fields. But the main advances and retreats of those glaciers and a few others in the Alps, are known for fully three centuries and estimates of their periods have been attempted. These do not correspond with Wolf's 11-year period, or with the 35-year one of Brückner. Some causes affect their movements, other than the snowfall in the upper region or névé and the ablation due to temperature changes in the lower; for of two adjacent glaciers, one may be advancing while another is retreating. Recent observations, as Prof. Mercanton points out, indicate that the volume and the length of a glacier can to some extent vary independently, or, in other words, that the ice moves down a valley from the more expanded névé basin at its head, not with perfect uniformity, but with local intermittance, so that a belt near the end may be swelling up in a wide mound and thus the actual volume of ice be increasing, while the end itself is in retreat. Prof. Mercanton observes that the subject of glaciers and their history is not yet exhausted.

**551.324:551.573  
AQUEOUS EXCHANGE BETWEEN THE NÉVÉ AND THE ATMOSPHERE.<sup>2</sup>**

By R. BILLWILLER.

(Abstract of paper presented to Swiss Society of Geophysics, etc., Zurich, Sept. 11, 1917.)

Many glaciologists have in the past occupied themselves with the question whether the Alpine glaciers and névés condense some of the water vapor in the atmosphere or, on the contrary, contribute water to the atmosphere by evaporation. The admirable study by Charles Dufour and F.-A. Forel<sup>3</sup> has not settled the question, nor rendered useless new and precise measurements. On the contrary it is important to resume the problem in the light of more extended and more conclusive experiments than theirs. It seems that Dufour and Forel overestimated the frequency and quantitative importance of condensation, basing their conclusions on the results of 15 days of observations made at the height of summer and at the front of the Rhone Glacier, i. e., under conditions of place and time most favorable to an energetic condensation.

The frequency of condensation or evaporation at a given location is best determined from regular observations on the temperature and the humidity of the air and of the temperature of the snow surface. I hope to be able to study the conditions of the Säntis from this standpoint.

The quantity of water condensed or evaporated is determined by weighing. For this purpose I have at present a special balance built after specifications of Prof. Dr. A. Picard, and conveniently carried in the satchel. It has functioned very nicely and so far has furnished the following determinations:

October 14 and 15, 1916, there was uninterrupted evaporation during 24 hours on the Säntis; the maximum was 0.071 mm. per hour, between 7<sup>h</sup> and 8<sup>h</sup>.

<sup>1</sup> R. Billwiller (Zurich). L'échange aqueux entre l'air et le névé. Arch. des sci. phys. et nat., Genève, 15. Nov. 1917, 44: 328-330.

<sup>2</sup> Dufour & Forel. Recherches sur la condensation de la vapeur aqueuse de l'air au contact de la glace et sur l'évaporation. Bull., Soc. vaudoise des sci. nat., Lausanne, 1917, 10: 621-684.

<sup>3</sup> A. de Quervain (Zurich). Sur la météorologie de l'inlandsis du Grönland et en particulier sur le föhn de l'inlandsis. Arch. des sci. phys. et nat., Genève, 15. Nov. 1917, 44.